This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (previously presented): For use with a node, a
2 method comprising:
3   a) accepting, using the node, status information
4   from at least two different kinds of routing
5   protocols;
6   b) composing, using the node, an aggregated message
7   including at least two indicators, each indicator
8   identifying a different one of the at least two
9   different kinds of routing protocols and the
10   corresponding status information from each of the at
11   least two different kinds of routing protocols as
12   data within the aggregated message; and
13   c) sending, using the node, the aggregated message
14   towards a neighbor node.

1 Claim 2 (previously presented): The method of claim 1
2 further comprising:
3   d) maintaining, using the node, a first timer for
4   tracking a send time interval, wherein the acts of
5   composing the aggregated message and sending the
6   aggregated message are performed after expiration of
7   the first timer; and
8   e) restarting, using the node, the first timer
9   after the aggregated message is sent.

1 Claim 3 (previously presented): The method of claim 2
2 wherein the aggregated message further includes a dead
3 time interval, and wherein the send time interval is less
4 than the dead time interval.

2

1 Claim 4 (previously presented): The method of claim 2
2 wherein the aggregated message further includes a dead
3 time interval, and wherein the send time interval is no
4 more than one third of the dead time interval.

1 Claim 5 (original): The method of claim 2 wherein the
2 send time interval is less than one second.

1 Claim 6 (original): The method of claim 2 wherein the
2 send time interval is less than 100 msec.

1 Claim 7 (previously presented): The method of claim 1
2 wherein the aggregated message further includes a dead
3 time interval.

1 Claim 8 (previously presented): The method of claim 1
2 wherein the act of sending the aggregated message
3 includes providing the aggregated message in an Internet
4 protocol packet.

1 Claim 9 (previously presented): The method of claim 8
2 wherein the act of sending the aggregated message towards
3 the neighbor node includes setting a destination address
4 in the Internet protocol packet to a multicast address
5 associated with routers that support aggregated protocol
6 liveness.

1 Claim 10 (previously presented): The method of claim 1
2 wherein the neighbor node has at least one routing
3 protocol peering with at least one of the at least two
4 routing protocols.

3

1 Claim 11 (previously presented): The method of claim 1
2 wherein the status information includes a routing
3 protocol state selected from a group of routing protocols
4 states consisting of (A) protocol up, (B) protocol down,
5 (C) protocol not reporting, and (D) protocol restarting.

1 Claim 12 (previously presented): For use with a node, a
2 method comprising:
3   a)   receiving, using the node, an aggregated message
4   including
5   i)   for a first set of at least two different
6   kinds of routing protocols of a neighbor node,
7   at least two indicators, each indicator
8   identifying a different one of the at least two
9   different kinds of routing protocols and
10   corresponding status information for each of
11   the protocols of the first set of the at least
12   two different kinds of routing protocols as
13   data within the aggregated message, and
14   ii) a time interval; and
15   b)   updating, using the node, neighbor node protocol
16   status information using the aggregated message.

1 Claim 13 (previously presented): The method of claim 12
2 wherein the act of updating neighbor node protocol status
3 information includes
4   i)   setting, using the node, a first timer to
5   the time interval and starting the first timer,
6   ii) if the first timer expires, setting, using
7   the node, the status of each of the protocols
8   of the neighbor node to down, and

4

9 iii) if a further message, sourced from the
10 neighbor node, and including
11   A) for a second set of at least two
12   protocols, at least two indicators, each
13   indicator identifying the at least two
14   routing protocols and corresponding status
15   information for each of the routing
16   protocols of the second set, and
17   B) a new time interval,
18 is received then, resetting, using the node,
19 the first timer to the new time interval and
20 restarting the first timer.

1 Claim 14 (original): The method of claim 13 wherein each
2 of the time interval and the new time interval is less
3 than one second.

1 Claim 15 (previously presented): The method of claim 12
2 wherein the status information includes a routing
3 protocol state selected from a group of routing protocols
4 states consisting of (A) protocol up, (B) protocol down,
5 (C) protocol not reporting, and (D) protocol restarting.

1 Claim 16 (previously presented): The method of claim 13
2 wherein the act of updating neighbor node routing
3 protocol status information further includes
4   iv) if the further message is received then,
5   in addition to resetting the first timer to the
6   new time interval and restarting the first
7   timer, further
8   A) determining, using the node, whether
9   the first set of at least two routing

5

10   protocols is the same as the second set of

11   at least two routing protocols,

12   B) if the first set of at least two

13   routing protocols is determined to be the

14   same as the second set of at least routing

15   two protocols, then for each of the at

16   least two routing protocols of both the

17   first and second sets having a changed

18   status, informing, using the node, a

19   locally running instance of the routing

20   protocol of the changed status of its peer

21   routing protocol of the neighbor node, and

22   C) if the first set of at least two

23   routing protocols is determined to be

24   different from the second set of at least

25   two routing protocols, then

26   1) for any routing protocol in the

27   second set but not in the first set,

28   informing, using the node, a locally

29   running instance of the routing

30   protocol of the status indicated in

31   the further message of its peer

32   routing protocol of the neighbor

33   node, and

34   2) for any routing protocol in the

35   first set but not in the second set,

36   informing, using the node, a locally

37   running instance of the routing

38   protocol that the status of its peer

39   routing protocol of the neighbor node

40   is down.

1 Claim 17 (previously presented): The method of claim 16
2 wherein each of the aggregated message and the further
3 message include an indication of a relative message age,
4 and wherein the act of updating neighbor node routing
5 protocol status information includes,
6   iv)   if the further message is received then,
7   in addition to resetting the first timer to the
8   new time interval and restarting the first
9   timer, further
10   A) determining, using the node, whether
11   the further message is younger than the
12   aggregated message, and
13   B) if it is determined that the further
14   message is not younger than the aggregated
15   message, then discarding, using the node,
16   the further message.

1 Claim 18 (previously presented): The method of claim 13
2 wherein each of the aggregated message and the further
3 message include an indication of a relative message age,
4 and wherein the act of updating neighbor node routing
5 protocol status information includes,
6   iv)   if the further message is received then,
7   in addition to resetting the first timer to the
8   new time interval and restarting the first
9   timer, further
10   A) determining, using the node, whether
11   the further message is younger than the
12   aggregated message, and
13   B) if it is determined that the further
14   message is not younger than the aggregated

7

15   message, then discarding, using the node,
16   the further message.

1 Claim 19 (previously presented): A method for monitoring
2 liveness of multiple protocols, the method comprising:
3   a) determining, at a first node, status information
4   for at least two different kinds of routing
5   protocols;
6   b) sending, from the first node, an aggregated
7   message including at least two indicators, each
8   indicator identifying a different one of the at
9   least two different kinds of routing protocols and
10   the corresponding determined status information for
11   the at least two different kinds of routing
12   protocols as data within the aggregated message to a
13   second node;
14   c) receiving, at the second node, the aggregated
15   message; and
16   d) updating, by the second node, first node routing
17   protocol status information using the aggregated
18   message.

1 Claim 20 (previously presented): The method of claim 19
2 wherein the aggregated message further includes a first
3 time interval, and wherein the act of updating neighbor
4 node routing protocol status information includes
5   i) setting a timer to the first time interval;
6   ii) starting the timer;
7   iii) determining whether or not a further
8   message including routing protocol status
9   information is received from the first node by

8

10   the second node before the expiration of the

11   timer; and

12   iv) if it is determined that a further message

13   including routing protocol status information

14   is not received from the first node by the

15   second node before the expiration of the timer,

16   then informing peer routing protocols of the

17   second node that the at least two routing

18   protocols of the first node are down.

1   Claim 21 (previously presented): The method of claim 19

2   wherein the status information includes a routing

3   protocol state selected from a group of protocols states

4   including at least (A) protocol up, (B) protocol down,

5   (C) protocol not reporting, and (D) protocol restarting.

1   Claim 22 (previously presented): A machine-readable

2   medium having stored thereon a machine readable

3   aggregated message comprising:

4   a) at least two indicators, each indicator

5   identifying a different one of at least two

6   different kinds of routing protocols of a node

7   stored as data within the aggregated message;

8   b) status information, for the at least two

9   different kinds of routing protocols of the node, of

10   a state of each of the at least two routing

11   protocols stored as data within the aggregated

12   message; and

13   c) a dead interval.

1   Claim 23 (previously presented): The machine-readable

2   medium of claim 22 wherein the status information

9

3   indicates a routing protocol state selected from a group

4   of protocols states consisting of (A) protocol up, (B)

5   protocol down, (C) protocol not reporting, and (D)

6   protocol restarting.

1   Claim 24 (original): The machine-readable medium of

2   claim 22 further comprising:

3   c) an identifier of the node.

1   Claim 25 (original): The machine-readable medium of

2   claim 24 wherein the node is a router and wherein the

3   identifier is a router identifier.

1   Claim 26 (original): The machine-readable medium of

2   claim 22 further comprising:

3   c) an interface index.

1   Claim 27 (previously presented): For use with a node,

2   apparatus comprising:

3   a) at least one processor;

4   b) at least one input device; and

5   c) at least one storage device storing

6   processor-executable instructions which, when

7   executed by one or more processors, perform a method

8   including

9   i) accepting status information from at least

10   two different kinds of routing protocols,

11   ii) composing, using the node, an aggregated

12   message including at least two indicators, each

13   indicator identifying a different one of the at

14   least two different kinds of routing protocols

15   and the corresponding status information from

10

16   each of the at least two different kinds of

17   routing protocols as data within the aggregated

18   message, and

19   iii) sending the aggregated message towards a

20   neighbor node.

1   Claim 28 (previously presented): The apparatus of claim

2   27 wherein the method further includes

3   iv) maintaining a first timer for tracking a send

4   time interval, wherein the act of composing the

5   aggregated message and sending the aggregated

6   message compose and send the aggregated message

7   after expiration of the first timer, and

8   v) restarting the first timer after the aggregated

9   message is sent.

1   Claim 29 (previously presented): The apparatus of claim

2   28 wherein the aggregated message further includes a dead

3   time interval, and wherein the send time interval is less

4   than the dead time interval.

1   Claim 30 (previously presented): The apparatus of claim

2   28 wherein the aggregated message further includes a dead

3   time interval, and wherein the send time interval is no

4   more than one third of the dead time interval.

1   Claim 31 (previously presented): The apparatus of claim

2   28 wherein the send time interval is less than one

3   second.

1   Claim 32 (previously presented): The apparatus of claim

2   28 wherein the send time interval is less than 100 msec.

11.

1   Claim 33 (previously presented): The apparatus of claim
2   27 wherein the aggregated message further includes a dead
3   time interval.

1   Claim 34 (previously presented): The apparatus of claim
2   27 wherein the act of sending the aggregated message
3   includes providing the aggregated message in an Internet
4   protocol packet.

1   Claim 35 (previously presented): The apparatus of claim
2   34 wherein the act of sending the aggregated message
3   includes setting a destination address in the Internet
4   protocol packet to a multicast address associated with
5   routers that support aggregated routing protocol
6   liveness.

1   Claim 36 (previously presented): The apparatus of claim
2   27 wherein the neighbor node has at least one protocol
3   peering with at least one of the at least two protocols.

1   Claim 37 (previously presented): The apparatus of claim
2   27 wherein the status information includes a routing
3   protocol state selected from a group of protocols states
4   consisting of (A) protocol up, (B) protocol down, (C)
5   protocol not reporting, and (D) protocol restarting.

1   Claim 38 (previously presented): For use with a node,
2   apparatus comprising:
3   a)   at least one processor;
4   b)   at least one input device; and
5   c)   at least one storage device storing
6   processor-executable instructions which, when

12

7   executed by one or more processors, perform a method

8   including

9   i)   receiving, using the at least one input, an

10   aggregated message including

11   A)   for a first set of at least two

12   different kinds of routing protocols of a

13   neighbor node, at least two indicators, each

14   indicator identifying a different one of the at

15   least two different kinds of routing protocols

16   and corresponding status information for each

17   of the protocols of the first set of the at

18   least two different kinds of routing protocols

19   as data within the aggregated message, and

20   B)   a time interval, and

21   ii)   updating neighbor node protocol status

22   information using the aggregated message.

1   Claim 39 (previously presented):   The apparatus of claim

2   38 wherein the act of updating neighbor node protocol

3   status information includes

4   A)   setting a first timer to the time interval

5   and starting the first timer,

6   B)   setting the status of each of the routing

7   protocols of the neighbor node to down if the

8   first timer expires, and

9   C)   if a further message, sourced from the

10   neighbor node, and including

11   1)   for a second set of at least two

12   protocols, at least two indicators, each

13   indicator identifying the at least two

14   routing protocols and corresponding status

13

15   information for each of the routing

16   protocols of the second set, and

17   2) a new time interval,

18   is received, resetting the first timer to the

19   new time interval and restarting the first

20   timer.

1 Claim 40 (previously presented): The apparatus of claim

2 39 wherein each of the time interval and the new time

3 interval is less than one second.

1 Claim 41 (previously presented): The apparatus of claim

2 38 wherein the status information includes a routing

3 protocol state selected from a group of protocols states

4 consisting of (A) protocol up, (B) protocol down, (C)

5 protocol not reporting, and (D) protocol restarting.

1 Claim 42 (previously presented): The apparatus of claim

2 39 wherein the act of updating neighbor node routing

3 protocol status information further includes

4   D) determining whether the first set of at

5   least two routing protocols is the same as the

6   second set of at least two protocols,

7   E) if the first set of at least two routing

8   protocols is determined to be the same as the

9   second set of at least two routing protocols,

10   then for each of the at least two routing

11   protocols of both the first and second sets

12   having a changed status, informing a locally

13   running instance of the routing protocol of

14   the changed status of its peer routing

15   protocol of the neighbor node, and

14

16　　　　　　F) if the first set of at least two routing

17　　　　protocols is determined to be different from

18　　　　the second set of at least two routing

19　　　　protocols,

20　　　　　　　1) for any routing protocol in the second

21　　　　　　set but not in the first set, informing a

22　　　　　　locally running instance of the routing

23　　　　　　protocol of the status indicated in the

24　　　　　　further message of its peer routing

25　　　　　　protocol of the neighbor node, and

26　　　　　　　2) for any routing protocol in the first

27　　　　　　set but not in the second set, informing a

28　　　　　　locally running instance of the routing

29　　　　　　protocol that the status of its peer

30　　　　　　routing protocol of the neighbor node is

31　　　　　　down.

1　Claim 43 (previously presented): The apparatus of claim

2　42 wherein each of the aggregated message and the further

3　message include an indication of a relative message age,

4　and wherein the act of updating neighbor node routing

5　protocol status information includes,

6　　　　　　D) determining whether the further message is

7　　　　　　younger than the aggregated message, and

8　　　　　　E) if it is determined that the further

9　　　　　　message is not younger than the aggregated

10　　　　　　message, then discarding the further message.

11

1　Claim 44 (previously presented): The apparatus of claim

2　39 wherein each of the aggregated message and the further

3　message include an indication of a relative message age,

15

4 and wherein the act of updating neighbor node routing
5 protocol status information includes,

6   D)   determining whether the further message is
7   younger than the aggregated message, and
8   E)   if it is determined that the further
9   message is not younger than the aggregated
10   message, then discarding the further message.

1 Claim 45 (previously presented): A system comprising:
2   a)   a first node adapted to
3   i)   determine status information for at least
4   two different kinds of routing protocols, and
5   ii)   send an aggregated message including at
6   least two indicators, each indicator
7   identifying a different one of the at least two
8   different kinds of routing protocols and the
9   corresponding determined status information for
10   the at least two different kinds of routing
11   protocols as data within the aggregated message
12   to a second node; and
13   b)   the second node adapted to
14   i)   receive the aggregated message; and
15   ii)   update first node routing protocol status
16   information using the aggregated message.

1 Claim 46 (previously presented): The system of claim 45
2 wherein the aggregated message further includes a first
3 time interval, and wherein the act of updating the first
4 node routing protocol status information includes
5   A)   setting a timer to the first time
6   interval;
7   B)   starting the timer;

16

8   C) determining whether or not a further

9   message including routing protocol status

10   information is received from the first

11   node by the second node before the

12   expiration of the timer; and

13   D) if it is determined that a further

14   message including routing protocol status

15   information is not received from the first

16   node by the second node before the

17   expiration of the timer, then informing

18   peer routing protocols of the second node

19   that the at least two routing protocols of

20   the first node are down.

1 Claim 47 (previously presented): The system of claim 46
2 wherein the status information includes a routing
3 protocol state selected from a group of protocols states
4 including at least (A) protocol up, (B) protocol down,
5 (C) protocol not reporting, and (D) protocol restarting.

1 Claim 48 (previously presented): The method of claim 1
2 wherein the status information is local routing protocol
3 status information.

1 Claim 49 (previously presented): The method of claim 1
2 wherein the status information is local status
3 information and wherein each of the at least two
4 different kinds of routing protocols is being run locally
5 on the node.

1 Claim 50 (previously presented): The method of claim 1
2 wherein the status information of at least one of the at

17

3 least two different kinds of routing protocols included
4 in the aggregated message includes a routing protocol
5 state set to protocol not reporting.

1 Claim 51 (previously presented): The method of claim 1
2 wherein the status information of at least one of the at
3 least two different kinds of routing protocols included
4 in the aggregated message includes a routing protocol
5 state set to protocol restarting.

1 Claim 52 (previously presented): The method of claim 12
2 wherein the status information of at least one of the at
3 least two different kinds of routing protocols included
4 in the first set of at least two different kinds of
5 routing protocols included within the aggregated message
6 includes a routing protocol state set to protocol not
7 reporting.

1 Claim 53 (previously presented): ·The method of claim 12
2 wherein the status information of at least one of the at
3 least two different kinds of routing protocols included
4 in the first set of at least two different kinds of
5 routing protocols included within the aggregated message
6 includes a routing protocol state set to protocol
7 restarting.

1 Claim 54 (previously presented): The method of claim 1
2 wherein a first one of the at least two indicators
3 identifies a first kind of routing protocol from a group
4 of routing protocols consisting of (A) Border Gateway
5 Protocol (BGP), (B) Intermediate system to intermediate
6 system (IS-IS), (C) Open Shortest Path First - Version 2

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7   (OSPF v2), (D) Open Shortest Path First -Version 3 (OSPF
8   v3), (E) Routing Information Protocol Version 1/Version 2
9   (RIP v1/v2), (F) Routing Information Protocol next
10   generation (RIP-ng), (G) Protocol-Independent Multicast
11   (PIM), (H) Distance Vector Multicast Routing Protocol
12   (DVMRP), (I) Label Distribution Protocol (LDP), (J)
13   Resource Reservation Protocol (RSVP) and (K) Link
14   Management Protocol (LMP), and
15   wherein a second one of the at least two indicators
16   identifies a second kind of routing protocol, which is
17   different from the first kind of routing protocol
18   identified, from a group of routing protocols consisting
19   of (A) Border Gateway Protocol (BGP), (B) Intermediate
20   system to intermediate system (IS-IS), (C) Open Shortest
21   Path First - Version 2 (OSPF v2), (D) Open Shortest Path
22   First -Version 3 (OSPF v3), (E) Routing Information
23   Protocol Version 1/Version 2 (RIP v1/v2), (F) Routing
24   Information Protocol next generation (RIP-ng), (G)
25   Protocol-Independent Multicast (PIM), (H) Distance Vector
26   Multicast Routing Protocol (DVMRP), (I) Label
27   Distribution Protocol (LDP), (J) Resource Reservation
28   Protocol (RSVP) and (K) Link Management Protocol (LMP).

1   Claim 55 (previously presented): The method of claim 12
2   wherein a first one of the at least two indicators
3   identifies a first kind of routing protocol from a group
4   of routing protocols consisting of (A) Border Gateway
5   Protocol (BGP), (B) Intermediate system to intermediate
6   system (IS-IS), (C) Open Shortest Path First - Version 2
7   (OSPF v2), (D) Open Shortest Path First -Version 3 (OSPF
8   v3), (E) Routing Information Protocol Version 1/Version 2
9   (RIP v1/v2), (F) Routing Information Protocol next

19

10   generation (RIP-ng), (G) Protocol-Independent Multicast

11   (PIM), (H) Distance Vector Multicast Routing Protocol

12   (DVMRP), (I) Label Distribution Protocol (LDP), (J)

13   Resource Reservation Protocol (RSVP) and (K) Link

14   Management Protocol (LMP), and

15   wherein a second one of the at least two indicators

16   identifies a second kind of routing protocol, which is

17   different from the first kind of routing protocol

18   identified, from a group of routing protocols consisting

19   of (A) Border Gateway Protocol (BGP), (B) Intermediate

20   system to intermediate system (IS-IS), (C) Open Shortest

21   Path First - Version 2 (OSPF v2), (D) Open Shortest Path

22   First -Version 3 (OSPF v3), (E) Routing Information

23   Protocol Version 1/Version 2 (RIP v1/v2), (F) Routing

24   Information Protocol next generation (RIP-ng), (G)

25   Protocol-Independent Multicast (PIM), (H) Distance Vector

26   Multicast Routing Protocol (DVMRP), (I) Label

27   Distribution Protocol (LDP), (J) Resource Reservation

28   Protocol (RSVP) and (K) Link Management Protocol (LMP).

1   Claim 56 (new): The method of claim 1 wherein the at

2   least two different kinds of routing protocols for which

3   the status information has been accepted have been

4   established prior to accepting the status information

5   from the at least two different kinds of routing

6   protocols.

1   Claim 57 (new): The method of claim 12 wherein the at

2   least two different kinds of routing protocols for which

3   the corresponding status information has been received in

4   the aggregated message have been established prior to

5   receiving the aggregated message.